NO-STOP DIVE COMPUTER

OPERATING MANUAL

English

CE

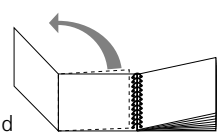
ALADIN® Sport

SWISS MADE BY UWATEC AG

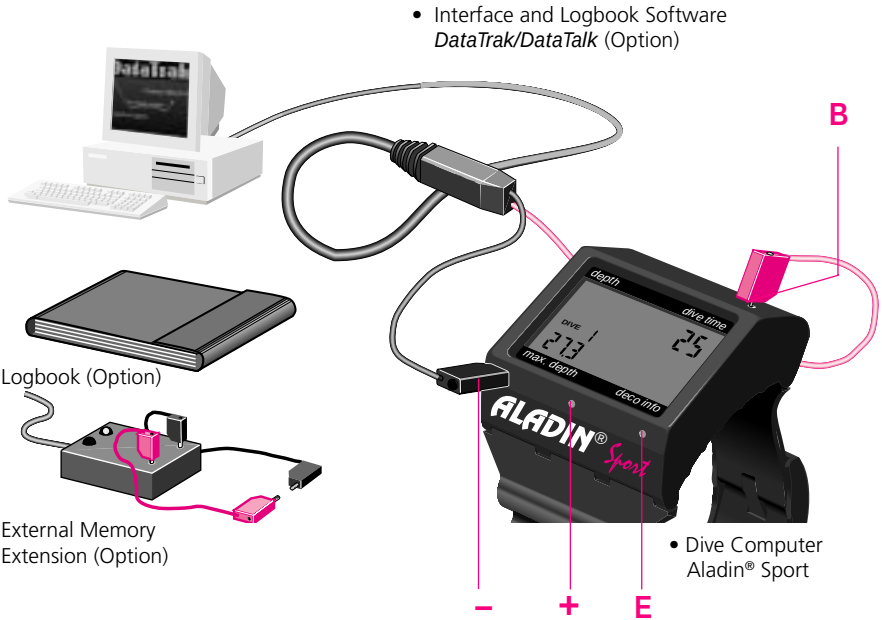
Aladin® Sport is a valuable diving companion which offers you highest possible comfort and a so far never reached standard of safety, if you strictly observe the following rules:

- Aladin® Sport does not replace either a profound diving training or a diving partner!
- Always dive according to your level or training. Aladin® Sport does not increase your abilities as a diver!
- Due to the danger of nitrogen narcosis do not dive deeper than 40 m. Aladin® Sport does not warn you in this respect.

- Strictly obey the optical alarm signals of Aladin® Sport. Avoid risk situations, which are marked ⚠ or STOP in this operating manual.
- You must read this operating manual carefully and completely!



December 1995, Copyright by Uwatec, Switzerland


• Interface and Logbook Software
DataTrak/DataTalk (Option)
B
depth
dive time
DIVE
273
25
max. depth
deco info
ALADIN® Sport
• Logbook (Option)
• External Memory
Extension (Option)
• Dive Computer
Aladin® Sport
–
+
E

Important Remarks

This operating manual makes use of the following icons to indicate especially important comments:

Remarks: Information and tips which are important for optimal use of the functions of your Aladin® Sport.

Attention! Information which draws your attention to situations and special features important for your diving comfort and the early avoidance of risk situations.

Danger!

Alarms which indicate risk situations and dangers. Ignoring these warnings can lead to situations involving danger to life and limb. These alarms must be obeyed!

The following symbols are used in the operating manual:

Flashing display

Operating instruction for manual input
(Example: bridging contacts B and E)

LIST OF CHAPTERS

I	INTRODUCTION	1
II	ALADIN® SPORT - SURVEY	9
III	DIVING WITH ALADIN® SPORT	23
IV	DIVING AT LOW RISK WITH ALADIN® SPORT	39
V	LOGBOOK	47
VI	DIVE-PLANNER	53
VII	INTERFACE AND SOFTWARE *DATATRAK/DATATALK*	59
VIII	TROUBLE SHOOTING	61
IX	APPENDIX	65

I INTRODUCTION

1 Aladin® Sport – Safe No-Stop Diving ____ **2**

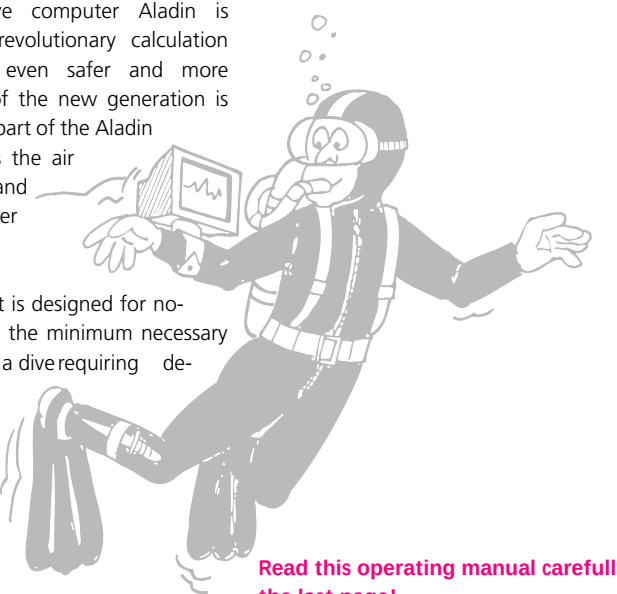
2 Aladin® Sport – Your Personal Companion ____ **3**

3 The Calculation Model ZH-L8 ADT
3.1 Description ____ **5**
3.2 Advantages ____ **6**

4 Safety in Diving ____ **8**

1 Aladin® Sport – Safe No-Stop Diving

The proven no-stop dive computer Aladin is enhanced with a new, revolutionary calculation model which makes it even safer and more comfortable. The Aladin of the new generation is called Aladin® Sport and is part of the Aladin family which also includes the air integrated Aladin® Air X and the decompression computer Aladin® Pro.



Although the Aladin® Sport is designed for no-stop diving it does provide the minimum necessary information in the event of a dive requiring decompression stops.

The new generation Aladin® Sport provides an increased level of safety and more features together with it's traditional ease of use.

Read this operating manual carefully and to the last page!

2 Aladin® Sport – Your Personal Companion

Aladin® Sport considers your individual reactions during the dive, the cooling of your skin and includes your workload as a constant value in the calculations. The test results of medical and physiological research were taken into consideration. The new calculation model also predicts and considers the effects of the formation of micro-bubbles in both the venous and arterial circulation depending on workload and skin temperature. This has led to the development of a unique, adaptive calculation model.

Aladin® Sport was exclusively designed for diving with compressed air and distinguishes itself from previous models and other commercial diving computers in a number of significant ways.

- The ZH-L8 ADT decompression calculation model considers eight body tissues as well as the diver's conduct and the ambient conditions. This allows for an even more precise calculation of the risk for decompression sickness which increases diver safety.

.• Compared to all previous models the Aladin® Sport is much more of a personal instrument, as it considers the individual conduct of the diver.
Different actions by diving buddies can lead to distinctive differences in the display of the decompression information. This is because risk situations (violations of diving rules) can have a significant effect on the physiological processes. On the other hand Aladin® Sport 'rewards' a diving conduct.

- The diver's workload is incorporated in the decompression calculations as a constant value. For the calculation of the surface intervals and the decompression information for repetitive dives the new model calculates on the basis that the physical performance at the surface is smaller than during the dive.

- Alarms are given optically in risk situations or in case of dangerous conduct.

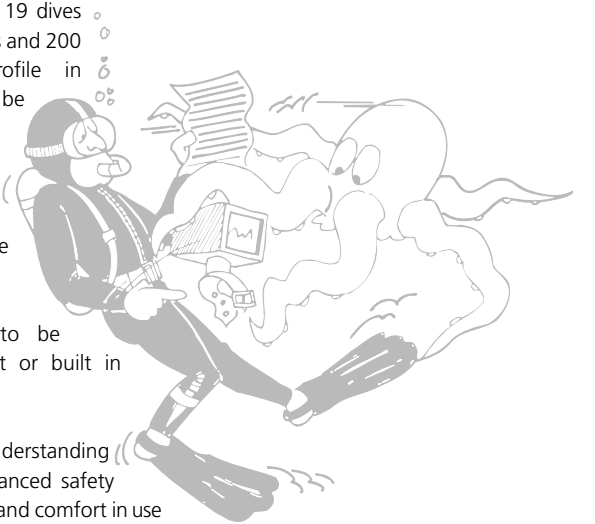
2 Aladin® Sport – Your Personal Companion

- By means of the logbook, the diver can directl call up the information of the last 19 dives Via interface to the PC, 37 dives and 200 minutes of precise dive-profile in intervals of 20 seconds can be read out.

- The dive planner allows the advance planning of no-stop dives with freely determinable surface intervals.

- Aladin® Sport is designed to be mounted on the diver's wrist or built in consoles.

- Ease of operation, ease of understanding the unambiguous display, enhanced safety advice, the PC interface option and comfort in use are all strong features of the new Aladin® Sport.



3 Calculation Model ZH-L8 ADT

3.1 Description

The Model ZH-L8 ADT (8 compartments with nominal half-time periods from 5 to 640 minutes) differs considerably from other models by the consideration of additional physiological processes:

1. Blood perfusion of the organs is not constant. Skin and muscles in particular are subject to considerable changes of blood perfusion depending on temperature and workload. A change in blood perfusion also causes a change of the saturation tolerance. The model takes these effects into account. Therefore, skin and muscle compartments show variable half-time periods and saturation tolerances.

   The necessary decompression times are calculated according to the workload and the decreasing skin temperature. The decrease of skin temperature is estimated based on the water temperature and the dive time. At the surface, the diver's physical performance is lower than during the dive. By considering the differences in physical performance the no fly time becomes considerably longer.

2. The model considers inert gas not only in the dissolved state, but also in the gaseous phase (microbubbles). Formation of microbubbles is calculated with allowance for the different influences in arterial and venous blood. With normal ascents gas bubbles mainly form in venous blood, with fast ascents also in arterial blood and on ignoring decompression stops in the tissues. As the model calculates microbubbles, those physiological processes are reconstructed which actually occur.
   The bubbles on the venous side of the circulation are carried into the lungs where they change the arterial nitrogen pressure. This influences mainly repetitive dives, dives with very long decompression times and the no fly time.

- Gross disregard of the ascent rate, exceeding the decompression depth and repeated ascents to the surface (yoyo dives), can all cause microbubbles to form on the arterial side and in tissues. Where the bubbles partially impair circulation, the rate of gas diffusion and the saturation tolerance are changed. No-stop-time, decompression time, and if necessary decompression depth, are adjusted so that existing bubbles stop growing. In addition, altered decompression assures that the tissue desaturates sufficiently if microbubbles impair circulation locally.

- The calculation of the gas bubbles results in a new ascent instruction. The ascent rate near the surface is reduced down to 7m/min. This prevents with high reliability the formation of microbubbles in the arterial circulation and minimizes the formation of microbubbles in the venous circulation after the dive.

3.2 Advantages

On first dives with correct diving technique and avoiding risk situations, there are no extended decompression times. On the other hand, it is possible to react correctly in risk situations due to the realistic simulation of the physiological processes in the body. This increases safety considerably. Risk situations are, for example:

- Repetitive dives (especially with short intervals) and dives on several successive days

- Dives in cold water

- Yoyo dives

- Flying after the dive

In case of *mistakes on the part of the diver*, actual prevention of decompression sickness is possible for the first time due to the reconstruction of the bubble formation and its consequences. The correction of the decompression must not be confused with a real recompression, which serves as therapy of already existing damage.

4 Safety in Diving

With its new decompression model Aladin® Sport offers a so far unreached level of safety. However, responsibility for the dive finally remains with the diver as before. The usual diving caution is still absolutely necessary when diving with Aladin® Sport.

In case of diver mistakes (ignoring decompression stops, excessive ascent rate etc.) Aladin® Sport can calculate a corrected ascent instruction immediately which minimizes the occurrence of decompression sickness. The prevention of barotrauma and nitrogen narcosis still lies in the hands of the diver.
Aladin® Sport is a highly developed technical instrument of high reliability. Despite this, the user of the Aladin® Sport is to have an understanding of the physiological interrelations, to know the use of decompression tables and to have them with him on every dive.

Should an incident occur, the detailed previous history of the incident is stored in the dive computer. The evaluation of these records allows better diagnosis and the most effective treatment for the diver.

1 The Aladin® System ____ **10**

2 Operation

2.1 Operating scheme for surface functions ____ **13**
2.2 Operating modes ____ **18**

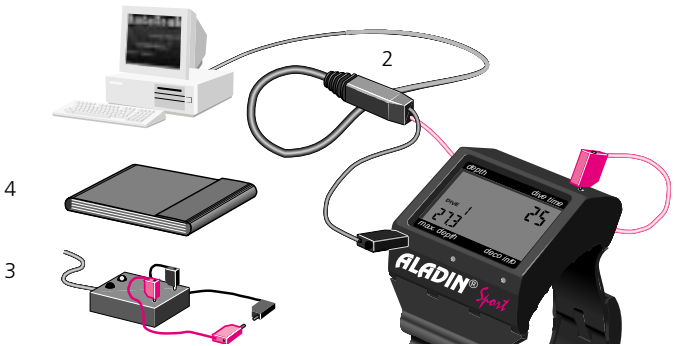
1 The Aladin System

The potential of the Aladin® Sport computer is expanded by the additional of accessory items.

1

1 During the dive the Aladin® Sport dive computer supplies only the important dive and decompression information, plus warnings if necessary. It has a logbook with the last 19 dives and a dive planner.

2 The configuration software *DataTalk* (supplied together with *DataTrak*) allows the alteration of a number of preset parameters of Aladin® Sport.



3 The external memory extension (ESE) makes it possible to read data from the logbook memory of Aladin® Sport without a personal computer. This is especially valuable on diving holidays.

4 The logbook software *DataTrak* enables you to print out logbook pages. You can get a special logbook with insert folders from your retailer.

2 Operation

Switching on display:
- automatically, on submerging in water or when adaptation to atmospheric pressure is necessary.
- manually by operating contacts on housing.

Switching off display:
- automatically, after three minutes without operation.

Aladin® Sport has 4 operating contacts B, E, +, – on the outside of the housing. For manual operation touch base contact B and any one of the other three contacts above the display with moistened fingers.

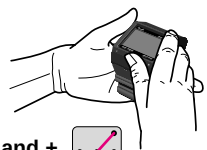
Contact B: Base contact, which has to be touched for all operations

Contact E: Enter contact. It serves to switch on the computer, to activate the logbook and dive-plan-mode and to switch between no-stop and decompression planning. It is also used to confirm inputs and is therefore comparable to the ENTER- or RETURN-key of a computer.

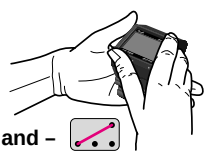
+ / – contacts: They serve to select the logbook and dive-plan as well as to set values (time, depth, dive-number etc.).

2.1 Operating scheme for surface functions

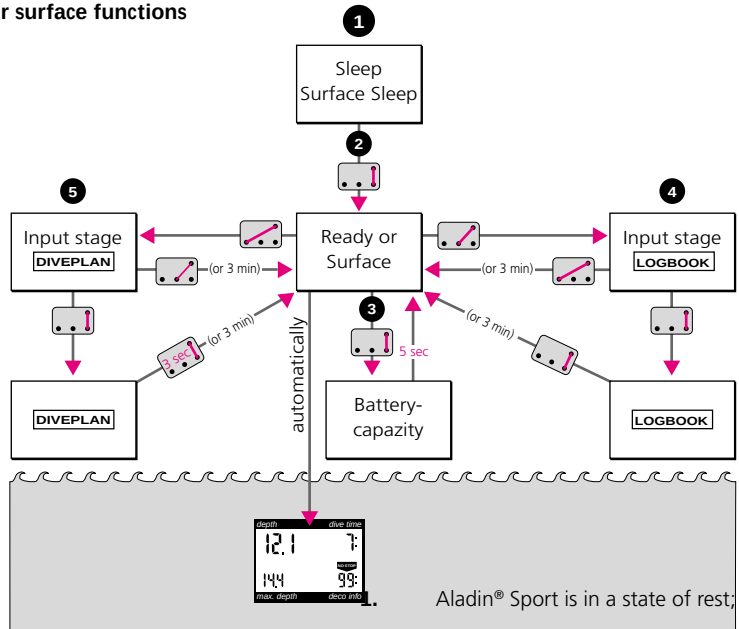
B and E



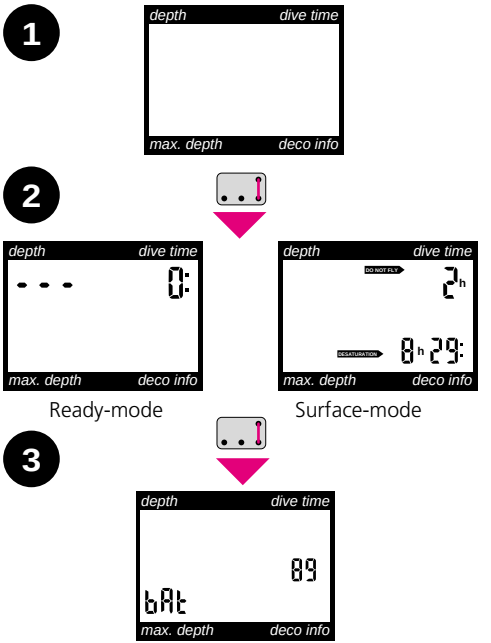
B and +



B and –



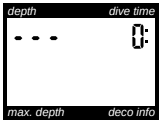
1. Aladin® Sport is in a state of rest;



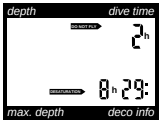
1. Aladin Sport is in a state of rest; no information is displayed (-> sleep-mode or -> surface-sleep-mode).

2. Bridging B and E activates the computer -> ready-mode or -> surface-mode.

3. A second bridging of contacts B and E activates the display of the remaining battery capacity for approximately 5 seconds.
As soon as the battery capacity is 0%, a battery alarm is sent (see page 26). There is still a small reserve left at bAt 0%.

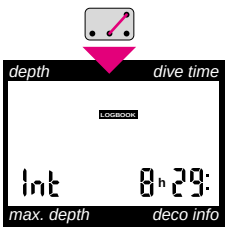


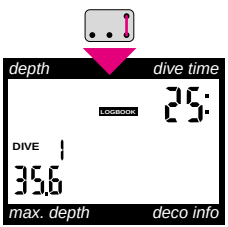
Ready-mode

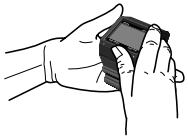


Surface-mode

4







4.a) Selecting the logbook function:

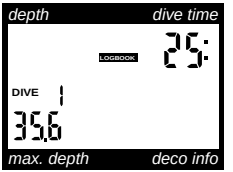
B and +

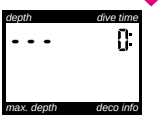
Cancel: B and –

or automatically after three minutes without operation

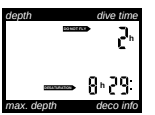
4.b) Activating the logbook:

B and E. Aladin® Sport shows the most recent dive.





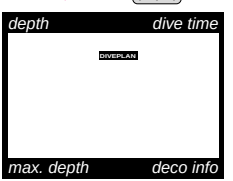
Ready-mode

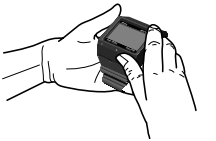


Surface-mode

or after 3 minutes

5





4.c) Leaving the logbook:

B and E

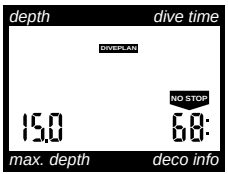
or automatically after three minutes without operation.

5.a) Selecting the dive-plan function:

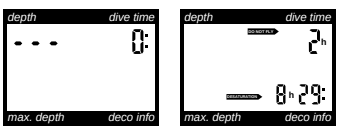
B and –.

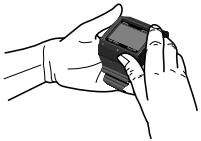
Cancel: B and +;

or automatically after three minutes without operation



or after 3 Minutes





5.b) Activating the dive-plan

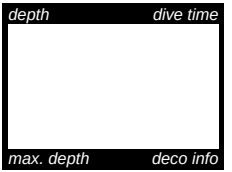
B and E. Aladin® Sport starts by listing no-stop times. If the dive-plan is activated out of the surface-mode, enter the desired interval by B and + or B and –. Confirmation with B and E.

5.c) Leaving the dive-plan:

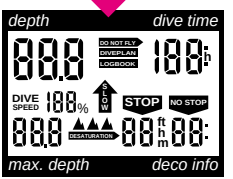
B and E for approx. 3 seconds
or automatically after three minutes.

2.2 Operating modes

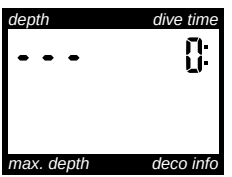
Aladin® Sport works in various operating modes:



Sleep-mode:
Activation: automatically
When Aladin® Sport is not used it is in the so called sleep-mode.
In this case, the electronics are «sleeping» for the most part, the display does not show any information. The computer is briefly activated once every minute to measure atmospheric pressure. The display remains switched off. If a change in altitude is recognized, Aladin® Sport switches to -> surface-mode for 3 minutes.

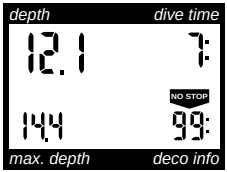


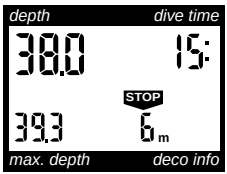
Ready-mode:
Activation: By touching contacts B and E from sleep-mode.
To check the display, all signs light up for 5 seconds.



Aladin® Sport switches into ready-mode afterwards. In ready-mode, the display is switched on and in certain circumstances altitude sections are also displayed.

On touching contacts B and E in ready-mode once more, Aladin® Sport displays the remaining battery capacity in percent. Three minutes after activating ready-mode, Aladin® Sport falls back into -> sleep-mode.

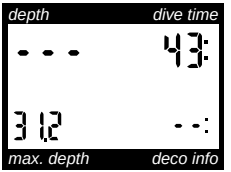




Dive-mode:

Activation: automatically, when depth more than 0.5 m.

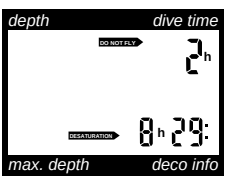
In dive-mode all diving functions are monitored: i.e. depth and dive time are displayed, maximum depth is stored, saturation of tissues is calculated with allowance for temperature, no-stop time or decompression prognosis is determined, ascent rate is controlled and displayed and the correctness of the decompression procedure is supervised.



Wait-mode:

Activation: automatically on reaching the surface.

The wait-mode is activated when the surface is reached after a dive. At the surface, the dive is not closed and entered into the logbook for an interval of 5 minutes. This allows a short surfacing for the purpose of orientation.

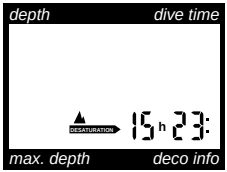


Surface-mode:

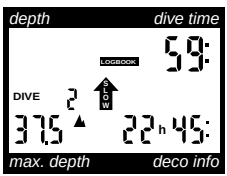
Activation: automatically after a dive or when changing altitude.

After a dive has been closed, Aladin® Sport is in surface-mode. All data belonging to the surface interval are calculated: Calculations are made on microbubble formation, on state of saturation of tissues after allowing for skin temperature and the assumed diver performance on the surface, on desaturation time and on no fly interval time.

In order to save energy, Aladin® Sport falls into the so called surface-sleep after 3 minutes. The functions of surface-mode are then carried out in the background. The atmospheric pressure is measured in surface-sleep once every minute.



If the atmospheric pressure decreases, for example because of change of altitude, Aladin® Sport automatically switches from sleep-mode or from surface-sleep into surface-mode and displays the adaptation time. The adaptation time is the time after which all body tissues have adapted to the ambient pressure (= desaturation time).

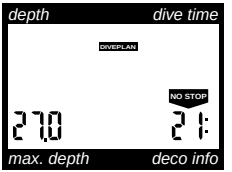


Logbook-mode:

Activation: manually by contacts

Data of 19 past dives can be called up in the logbook mode. It shows, for example, maximum depth, dive time, preceding interval, altitude sections and, where appropriate, alarms. A dive is entered in the logbook if it has lasted more than 2 minutes. It also shows the interval which has passed since the last dive or a preceding change of altitude.

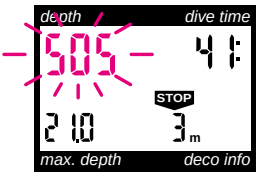
By means of an interface Aladin® Sport can be connected with an MS DOS personal computer. In that case, the last 37 dives and the last dive-profiles can be read out. The number of profiles depends on the length of the dives (a maximum total of 200 diving minutes).



Diveplan-mode:

Activation: manually by contacts

The diveplan-mode assists the planning of a future dive. It allows planning of no-stop and decompression dives with freely determinable depth and dive time. On repeat dives, the surface interval can be chosen at will. Calculations are based on the temperature data of the last dive and assume a normal workload.



SOS-mode:

Activation: automatically

If the diver remains above a depth of 1.2 metres for more than three minutes without observing the prescribed decompression, the computer switches into SOS-mode after the dive and displays <SOS> instead of the depth. The computer is locked for use for the next 24 hours. Desaturation is still calculated including microbubbles in the tissues. Diving is again possible after 24 hours, but the SOS-mode can influence the calculations of Aladin® Sport for another three days after the incident (microbubbles).

An eventual accident can be analysed by means of the PC-interface and *DataTrak*-software.

I Terminology/Symbols ____ **24**

2 Attention Messages and Alarms

2.1 Attention messages ____ **25**
2.2 Alarms ____ **26**
2.3 Alarm low battery ____ **26**

3 Preparation for the Dive ____ **27**

4 Functions during the Dive

4.1 Dive time ____ **28**
4.2 Dive depth ____ **28**
4.3 Maximum depth ____ **29**
4.4 Ascent rate ____ **29**
4.5 Decompression information ____ **31**

5 Surface Functions

5.1 End of a dive ____ **33**
5.2 Desaturation time ____ **34**
5.3 No fly time ____ **35**
5.4 Warning of bubbles ____ **36**

6 Diving in Mountain Lakes ____ **37**

1 Terminology/Symbols

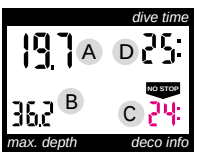
The Aladin® Sport is a dive computer primarily designed for diving in the no-stop phase. If a decompression dive is carried out in spite of that, the Aladin® Sport offers a decompression prescription. The indications of the display vary depending on the phase of the dive.

No-stop phase: Dive phase, during which ascent is allowed without decompression stops.

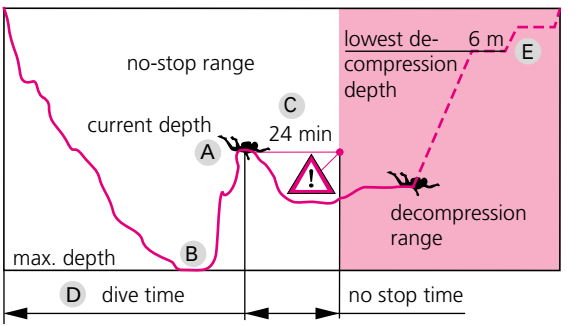
Decompression phase: Dive phase during which a decompression stop has to be observed during the ascent.

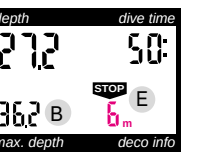
Decompression depth: Lowest stage is displayed.

Dive time: Time of the dive below depth of 1.2 m.



Display during no-stop phase





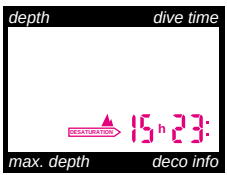
Display during decompression phase

2 Attention Messages and Alarms

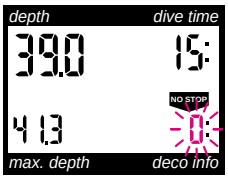
Aladin® Sport draws the diver's attention to certain situations and also warns him of wrong actions. Attention messages and alarms are communicated to the diver optically by lit up symbols, letters or flashing figures.

2.1 Attention messages

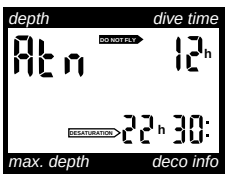
Attention messages come up in the following situations:



Dive in mountain lake.
On a change of altitude, the altitude section (0-3) and adaptation time is shown. See page 37.

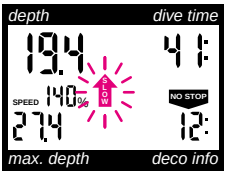


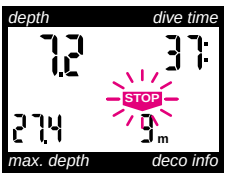
End of no-stop phase.
In order to prevent a decompression dive ascend a few metres.



Warning of bubbles.
Extension of the surface interval is recommended. See pages 36 and 57.

2.2 Alarms



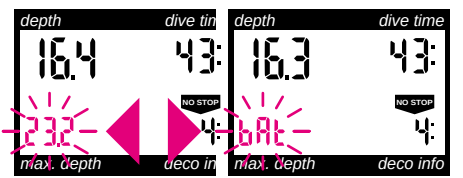


An alarm occurs in the following situations:

Excessive ascent rate.
Reduce ascent rate.

Ignoring decompression stop
Descend to the prescribed decompression depth at once!

2.3 Alarm low battery

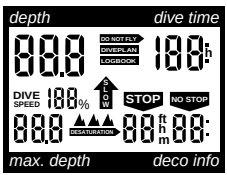


In dive-mode, <bAt> is indicated by flashing display and alternating with the display of maximum depth, as soon as battery capacity is 0%.
In ready-mode and surface-mode, <bAt> is shown instead of maximum depth. Have the batteries changed by your retailer!

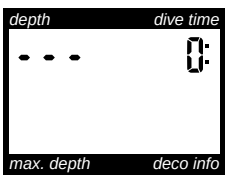
3 Preparation for the Dive

Basically, Aladin® Sport need not be switched on manually. When submerged in water, the contacts are bridged by the water and the dive computer switches into dive-mode directly.

It is advisable to check the functions immediately before the dive in the diving location:



1 Switching on Aladin® Sport manually.
Bridge contacts B and E with moistened fingers. Check test display: Are all displays lit?



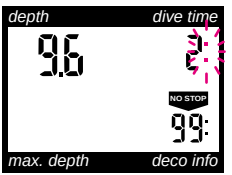
2 The Aladin® Sport is now in ready-mode.
After three minutes without operation or submerging in water, Aladin® Sport switches off the display. It need not be switched on again. It switches on automatically on submerging in water and activates the dive-mode as soon as a depth of more than 2 feet is reached. The display of the depth may appear a little delayed.

In extremely pure freshwater, it may occur that automatic activation of dive-mode does not work. On descending Aladin® Sport responds to the increase in pressure and switches into —> dive-mode. There may be a delay of up to 1 minute.

4 Functions during the Dive

4.1 Dive time

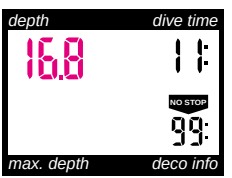
The whole time spent below a depth of 1.2 metres is displayed as dive time in minutes. While the dive time is running, the colon on the right of the figures is flashing at 1 second intervals. Maximum dive time displayed is 199 minutes.

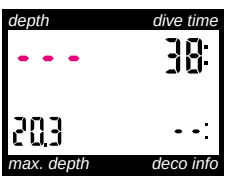


If a dive lasts longer than 199 minutes, the dive time display starts again at 0 minutes, because the display cannot show a larger figure.

4.2 Current depth

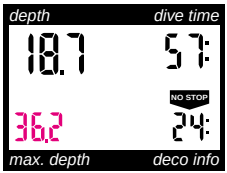
Current depth is given in 10 cm increments. On switching on and at a diving depth of less than 0.5 m the void display <—> appears.





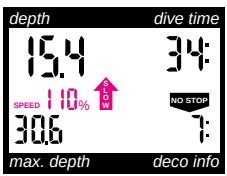
Depth measurement is based on fresh-water. Therefore, Aladin® Sport shows a slightly greater depth than actually true when diving in salt water, depending on the salinity of the water.

4.3 Maximum depth



The maximum depth is only displayed if it exceeds the current depth by more than one metre. This is to prevent the display changing very frequently when diving in the vicinity of the maximum depth.

4.4 Ascent rate



Optimal ascent rate varies between 7 and 20 m/min dependent on the depth. It is displayed in percent of the set value. If the ascent rate is bigger than 100% of the set value, the black arrow <SLOW> appears. If the ascent rate exceeds 140%, the arrow starts flashing.

Messages

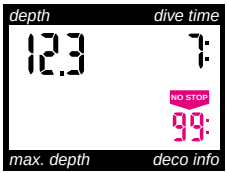
	Ascent rate	Optical alarm

– The prescribed ascent rate has to be observed. Excessive ascent rate can lead to microbubbles in the arterial circulation. Reduce ascent rate!

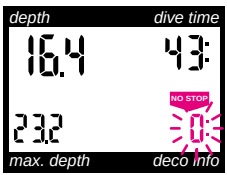
– It is possible that Aladin® Sport demands a decompression stop within the no-stop phase because of the danger of the formation of microbubbles.
– Decompression time necessary for the prevention of microbubbles can increase massively, if the ascent rate is exceeded.
– From great depth, too slow an ascent causes super-saturation of tissues and an extension of decompression timeand total ascent time. From little depth, shortening of decompression times is possible because the tissues already start desaturating during the ascent.

4.5 Decompression information

No-stop time is displayed, if no decompression stops are necessary yet. The arrow <NO STOP> is visible. The figures indicate no-stop time in minutes.



– No-stop display <99:> means remaining time of 99 minutes or more.
– No-stop time is calculated assuming normal workload and current water temperature.

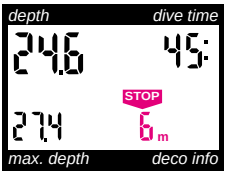


Messages:

In the last minute of the no-stop phase the no-stop display shows the flashing value <0>.

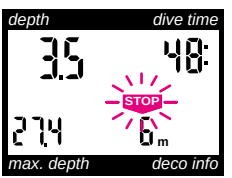
Action: In order to prevent a decompression dive, you have to ascend a few metres after this message.

Decompression values



On entering the decompression phase, the arrow <NO STOP> extinguishes. The arrow <STOP> appears. Right beside the arrow, the lowest decompression stage in metres is displayed. Beside the decompression depth, the decompression time of the dipslayed stage in minutes appears. The display <6m> means that a decompression stop at a depth of 6 m has to be made.
When a decompression stop has been finished, the next higher is displayed. When all decompression stops have been made, the arrow <STOP> extinguishes and the arrow <NO STOP> reappears. The indication of time on the lower right shows the no-stop time again.

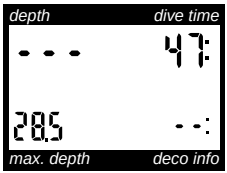
Messages:



The decompression alarm is activated if the decompression stop is ignored. Arrow <STOP> flashes. Due to the formation of microbubbles decompression can increase massively while a decompression stop is ignored. If the surface is reached during the decompression alarm, the arrow <STOP> continues flashing, in order to point to the risk of a decompression accident. The SOS-mode is activated 3 minutes after the dive.
If the total (cumulative) duration of the decompression alarm is longer than a minute it is entered in the logbook.

Action: Descend to the prescribed decompression depth at once!

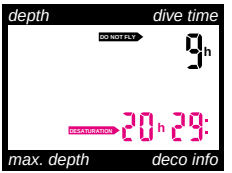
5.1 End of a dive



After reaching the surface, Aladin® Sport switches into wait-mode automatically for five minutes. This is the time span necessary to recognize the end of the dive. The delay allows for coming to the surface for orientation and the resumption of the dive afterwards.
When the dive is closed after 5 minutes in wait-mode, it is entered into the logbook and Aladin® Sport switches into surface-mode.

In surface-mode, Aladin® Sport shows desaturation time and no fly time.

5.2 Desaturation time

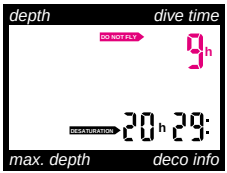


Aladin® Sport is in surface-mode. The arrow <DESATURATION> appears; beside desaturation time in hours and minutes is displayed. Desaturation time is continually indicated until the next dive or until it reaches zero. The display is switched off to save energy 3 minutes after the last manipulation (surface-sleep-mode). Desaturation calculations continue to be made in the background.

– In some cases, desaturation times of the new Aladin® Sport are considerably longer than those of its predecessors, because the calculation model assumes reduced physical activity at the surface and calculates with shorter half-time periods.

– If desaturation time reaches the value 0, all tissues are desaturated. Aladin® Sport switches into sleep-mode.

5.3 No fly time

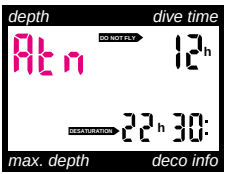


The waiting period until the next flight is indicated as follows: <DO NOT FLY>; beside, time in hours.

In some cases the no fly time is considerably longer than with previous models (reason: see desaturation time).

The no fly time must be strictly observed because of the danger of the formation of gas bubbles.

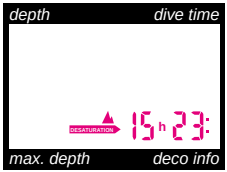
5.4 Warning of bubbles



Through repetitive dives microbubbles accumulate in the lungs if the surface interval is not long enough. Ignoring decompression or an excessive ascent rate can also lead to bubbles in tissues. In certain circumstances, in order to reduce the risk through further repetitive dives, an extended surface interval should be planned. The prognosis on the formation of bubbles during the surface interval allows Aladin® Sport to advise the diver to extend the surface interval. If the display <Atn> (=attention) is visible instead of the depth during the surface interval (surface-mode), the diver should extend the surface interval. The extension of the interval prevents a high concentration of bubbles in the lungs during the planned dive and avoids a risk situation.

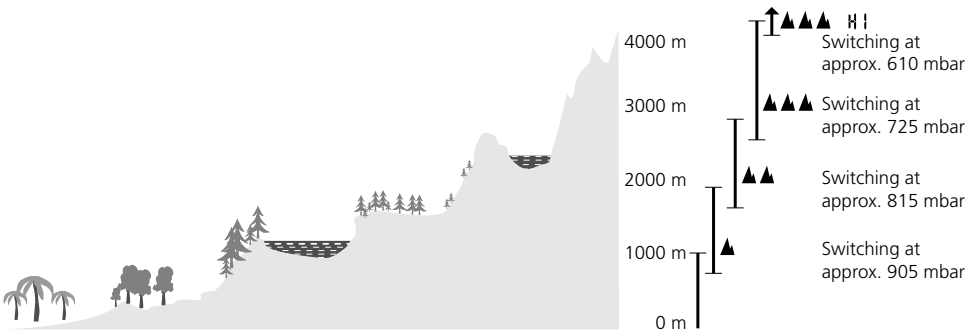
– If the dive has to be made during <Atn> time, the <Atn> time of the following dive can increase considerably.

– If the dive is made in spite of the display <Atn>, the diver must cope with a clearly shorter no-stop time and an extension of decompression.



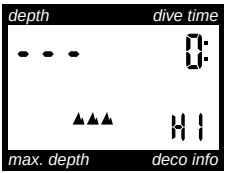
Aladin® Sport also measures the atmospheric pressure in sleep-mode. If the computer detects a higher altitude section, it switches into surface-mode automatically. Desaturation time indicated at this moment refers to adaptation time at this altitude. If diving starts within this adaptation time, Aladin® Sport treats it as a repetitive dive, since the body still has a higher saturation.

The entire altitude range is divided into four sections which are influenced by meteorological circumstances. That is why the following altitude sections overlap on their fringes. The altitude section is indicated at the surface, in the logbook and in the dive planner by stylized mountains, if a mountain lake altitude is reached. Section 0 is not indicated. In the following, you can see the approximate altitude ranges of the four sections:



6 Diving in Mountain Lakes

In order to assure optimal decompression also at higher altitudes, the 3 m decompression stage is divided into a 4 m stage and a 2 m stage (the prescribed decompression depths are in consequence 2 m, 4 m, 6 m, 9 m...).



Aladin® Sport can be used as decompression computer in case of an emergency up to an altitude of 4000 m. If atmospheric pressure is below 620 mbar (higher altitude than 4000 m above sea level), no decompression information is displayed any more. Dive-plan-mode can no longer be started, since no decompression information is available. Beside the display of the altitude section 3, <HI> (=high) appears to tell the diver that he will not get any decompression information for the dive.

Very small differences in the pressure sensors can cause an indication of different altitude sections of two dive computers at the same altitude on the fringes of the altitude ranges. These differences are not meaningful and do not interfere with the safety of Aladin® Sport. But if an altitude section is displayed at sea level or the altitude informations of two computers differ by more than one altitude section (e.g. section 2 instead of 0), there may be a defect of the computer. In this case, send your computer back to your retailer for checking.

1 Diving at Low Risk with Aladin® Sport

1.1 Dive at low risk ____ **40**
1.2 Minimizing risks on first dives ____ **40**
1.3 Minimizing risks on repetitive dives ____ **41**
1.4 Action in risk situations ____ **41**

1 Diving at Low Risk with Aladin® Sport

1.1 Dive at low risk

The most recent results of decompression research and an enhanced interpretation of diving accidents allow the deduction of guide-lines for diving at low risk. Aladin® Sport recognizes and reacts 'intelligently' to risk situations. Of course, it is advantageous if these situations are avoided beforehand. The optional PC-interface allows the analysis of such risk situations in an optimal way. This is the educational contribution of Aladin® Sport to the prevention of diving accidents. The following remarks give (where possible) some hints to a low risk diving technique.

1.2 Minimizing risk on first dives

The risk can be diminished on first dives by avoiding risk situations and by the selection of a dive profile 'low in bubbles'. This leads to the following recommendations:

- strictly observe ascent rate and decompression stops
- avoid repeated ascents to shallower depths (yoyo-dives)
- avoid exertion at depth
- plan shorter duration for dives in cold water
- after completion of the decompression or at the end of no-stop dives, ascend the last metres to the surface very slowly.

1.3 Minimizing risks on repetitive dives

There is still excess nitrogen in the body due to the history of the preceding dive. Depending on the duration of the surface interval, there may even be gaseous nitrogen (microbubbles). You can minimize the risk by observing certain rules:

– observe the same rules for repetitive dives as on your first dive
– plan repetitive dives at a smaller depth than the first dive
– plan a sufficient duration of the surface interval (min. 3-4 hours)
– only go on repetitive dives, if no indication <Atn> is visible on the display
– plan a day without diving once a week
– avoid exertion at depth and during the ascent
– make sure you always have enough air for the ascent

1.4 Action in risk situations

If the dive includes a risk situation, Aladin® Sport reacts automatically and appropriately to the situation. A change of decompression is indicated if it is actually necessary to minimize the risk. The diver can further reduce the risk through sensible conduct on the next dive and at the same time prevent long decompression stops.

A few examples are given on the following pages:

Situation: The diver ascends much too rapidly:

Reaction of computer: The model calculates the formation of bubbles due to the excessively rapid ascent. No-stop time is shortened or a longer decompression prescription is displayed in order to assure sufficient decompression.

Recommended action of the diver

During the dive: Observe the decompression instruction of Aladin® Sport.

After the dive: Watch out for symptoms of an arterial gas embolism and decompression sickness.

Before the next dive, plan a sufficiently long interval (display <Atn> should have disappeared).

Situation: The diver disregards the prescribed decompression depth for some time.

Reaction of computer: The model calculates the formation of bubbles due to ignoring decompression. Waiting time at the displayed decompression stage is extended or a lower decompression stage is displayed in order to assure sufficient time for desaturation.

Recommended action of the diver

During the dive:
Avoid decompression dives.
Descend to the prescribed decompression depth at once.
Do not descend to greater depths any more.
Observe the decompression instruction of Aladin® Sport.

After the dive:
Watch out for symptoms of arterial gas embolism and decompression sickness.

Before the next dive, plan a sufficiently long interval (display <Atn> should have disappeared).

Situation: The diver is exposed to exertion for a long period (e.g. in a current).

Recommended action of the diver

During the dive:	Avoid further physical exertion if possible. Make a break for relaxation.
	Extend decompression time at the highest stop if possible.
After the dive:	Refrain from intense physical exertion on your next dive.
	Make sure that the surface interval is long enough. It may be advisable not to go on another dive on the same day.

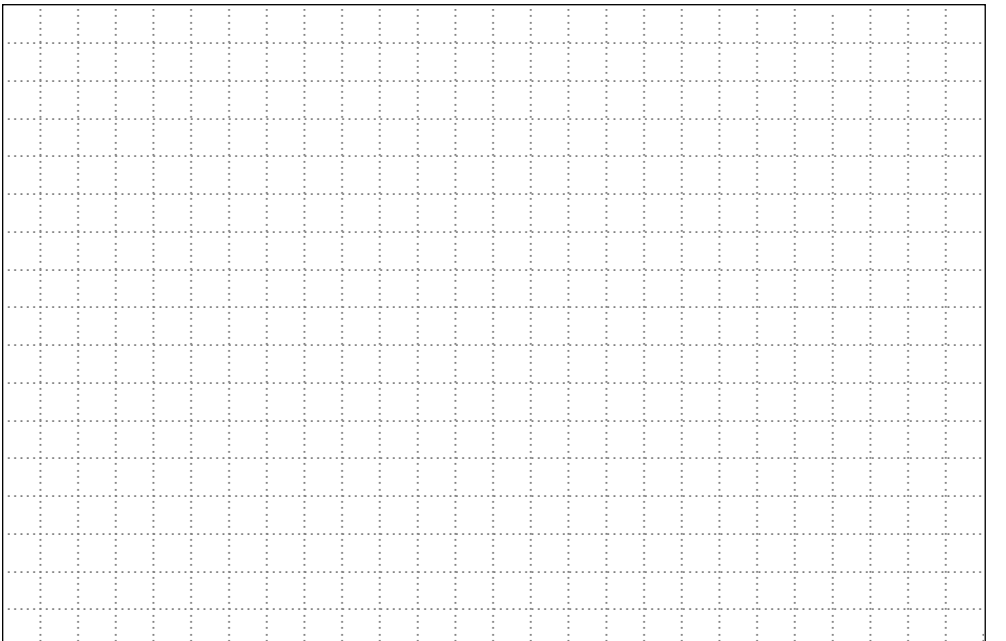
Situation: It is impossible to have a sufficient surface interval so that the indication <Atn> would extinguish prior to the next dive (e.g. on organized diving trips from a boat).

Reaction of computer: Aladin® Sport calculates a more conservative no-stop time or decompression prescription in order to allow nitrogen in the vicinity of bubbles enough time for desaturation.

Recommended action of the diver

During the dive: Be careful to have a profile 'low in bubbles' on your next dive (limit depth to 25 m max., slow ascent).

After the dive: Before the next dive, plan a sufficiently long interval (display <Atn> should have disappeared).



1 Survey ____ 48

2 Selection and Activation ____ 49

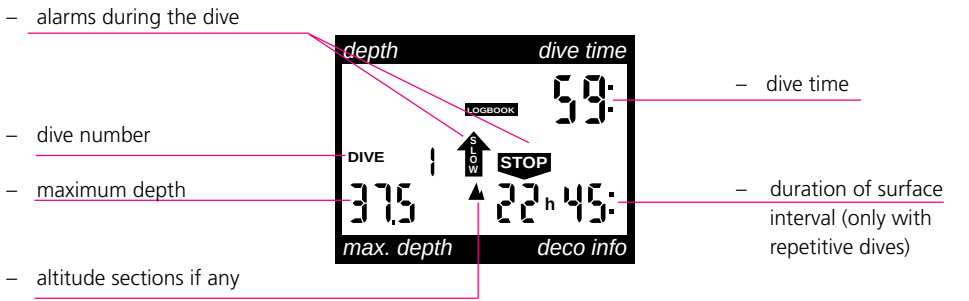
3 Selection of Dive ____ 50

4 Leaving Logbook-Mode ____ 51

5 Output on PC ____ 52

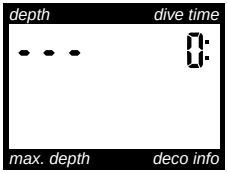
1 Survey

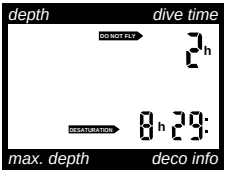
Aladin® Sport features a logbook with the last 19 dives. A dive is only entered in the logbook if dive time is longer than 2 minutes. Displayed information of the dive:



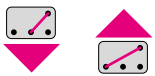
If a dive is started within adaptation time (after a change of altitude), the adaptation time is displayed instead of the surface interval.

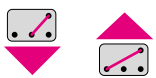
2 Selection and Activation



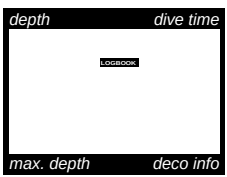


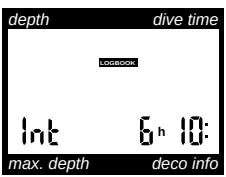
1. The logbook is selected by bridging contacts B and + in ready-mode or surface-mode. Indication <LOGBOOK> appears. If Aladin® Sport has been in surface-mode before, the surface interval appears as well. You go back into ready-mode or surface-mode by B and –.

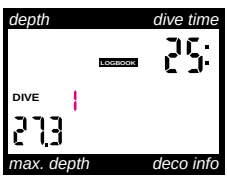




2. In order to activate the logbook, bridge contacts B and E. The most recent dive is displayed (DIVE 1).

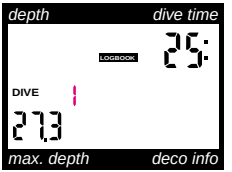






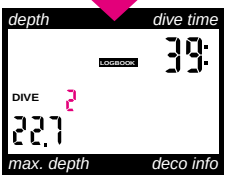
V

3 Selection of Dive



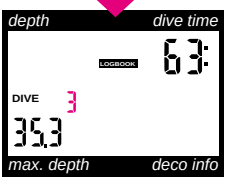
1. Bridge contacts B and + to get the information of the dive preceding the most recent one. Display <DIVE 2> appears.

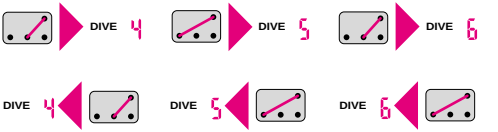
2. On every further bridging B and + the logbook jumps to the next older dive (DIVE 3).

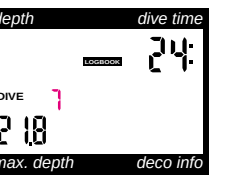


3. On constant bridging of the contacts all dives are displayed successively.

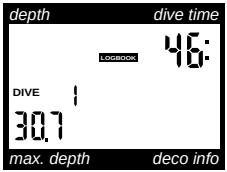
4. Bridging contacts B and – switches back from older dives to more recent ones.



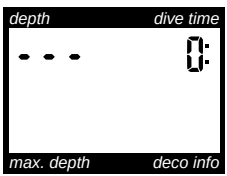


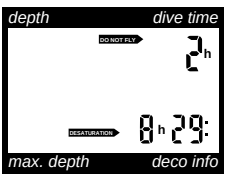


4 Leaving Logbook-Mode



or after 3 minutes





Touch contacts B and E.

Aladin® Sport switches back into ready-mode or surface-mode. This also happens 3 minutes after activating logbook-mode.

5 Output on PC

By means of a PC-interface and the *DataTrak* software, available as an accessory, the information of the last 37 dives can be read out. In the same way, the dive profiles of the last dives, up to a total of 200 minutes, can be reproduced (see Page 60ff).

Time and date of the dive are entered automatically, based on the clock of the PC-system when the data are transferred via interface.

The possibilities and the procedure of this data transfer are described in a separate manual.

I Survey ____ 54

2 Selection and Activation from Ready-Mode ____ 55

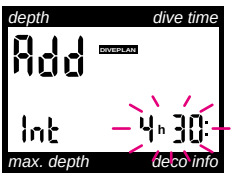
3 Selection and Activation from Surface-Mode ____ 56

4 Planning a No-Stop Dive ____ 57

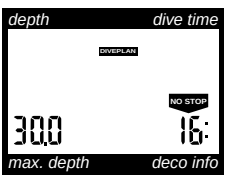
5 Leaving the Dive-Plan-Mode ____ 58

1 Survey

The Aladin® Sport is equipped with a dive planner which allows the planning of no-stop and decompression dives with freely determinable surface intervals. The water temperature of the most recent dive and present altitude sections ▲▲ are incorporated in the calculation.
The Aladin® Sport does not allow the planning of decompression dives.

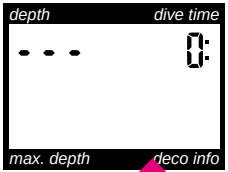


Presetting the surface interval (only during desaturation)

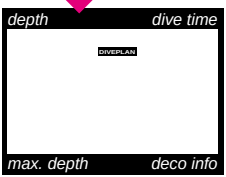


Planning of no-stop dives

2 Selection and Activation from Ready-Mode

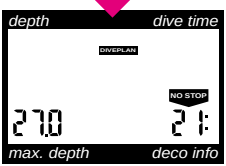


1. From ready-mode, you switch into the dive-plan input stage with contacts B and –.



2. The display shows <DIVEPLAN>. You return to ready-mode by B and +.

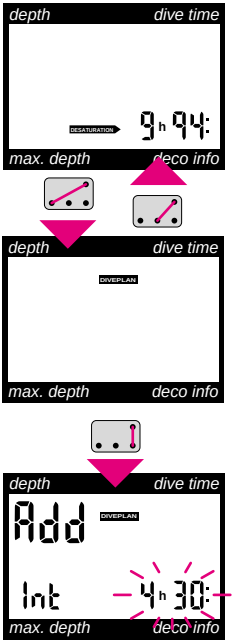
3. Contacts B and E afterwards activate the planning mode.



4. The display shows no-stop times for increasing depths (scrolling no-stop times, see page 57, planning of a no-stop dive).

VI

3 Selection and Activation from Surface-Mode



1. From surface-mode, you switch into the dive-plan input stage by B and –.

2. The display shows<DIVEPLAN>. You return to surface mode by B and +.

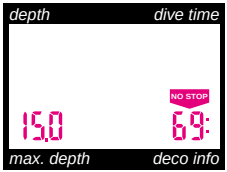
3. After confirming by B and E, the display shows <Add>, <Int> and the interval (flashing). Aladin® Sport expects your input for the duration of the dive interval.

4a. If no surface interval is to be entered, (diving at the present moment), confirm this with contacts B and E, and you switch into no-stop planning.

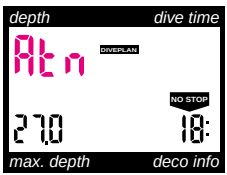
4b. You can extend the interval with contacts B and +. B and – shorten the interval.

5. You confirm the new interval with B and E and get to no-stop planning (page 57).

4 Planning a No-Stop Dive



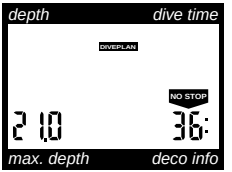
After confirming the surface interval (if possible), no-stop times are displayed in 3-metre-increments. The process starts at the deepest depth where the no-stop time is for the first time less than 99 minutes. The no-stop time for every 3-metre-increment is displayed for about 3 seconds (scrolling no-stop times).



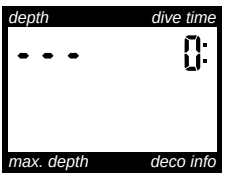
Repetitive dives usually cause more microbubbles in the lungs than first dives if the surface interval is not long enough. Too rapid ascent and/or disregard of decompression instructions can lead to microbubbles. By calculating the formation of bubbles, Aladin® Sport is able to advise the diver to extend the surface interval if necessary. If <Atn> is displayed instead of the depth in addition to the no-stop times, the diver should plan an extension of the interval if possible. This reduces the risk of many microbubbles in the lungs for the planned dive.

- By repeated recalculations of the dive-plan with varying surface intervals the minimum interval can be found out.
- When diving in spite of the display <Atn>, a clear shortening of the no-stop time and an extension of decompression has to be expected.
- If a dive is made during <Atn> -time, the <Atn>-time following the dive can increase considerably.

5 Leaving the Dive-Plan-Mode



or after 3 minutes



If the contacts B and E are touched for about 3 seconds, Aladin® Sport returns to ready-mode or surface-mode. This also occurs three minutes after the activation of the dive-plan-mode.

If two or more divers plan a dive, planning has to be based on the dive computer that shows the shortest no-stop times.

1 Interface and Logbook Software *DataTrak/DataTalk*

1.1 Personal Programming of the dive computer _____ **60**

1.2 Analysis and storage of real dives _____ **60**

1 Interface and Logbook Software *DataTrak/DataTalk*

The Aladin® Sport is able to communicate with a personal computer. The connection is established by contact sensors. A special interface cable and the necessary PC-software *DataTrak/DataTalk* (MS-DOS) is available. Communication via interface has a number of advantages:

1.1 Personal programming of the dive computer

By means of the *DataTalk* software you can choose if depth is indicated in feet or metres.

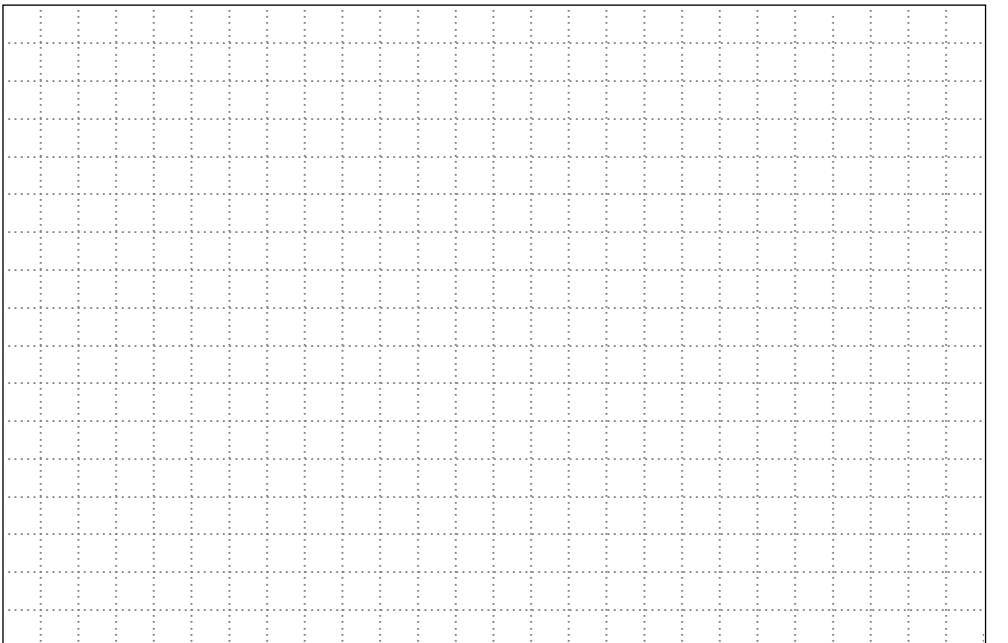
1.2 Analysis and storage of real dives

The last approx. 200 minutes of the dive are stored by the dive computer in increments of 20 seconds and can be transferred to the PC. The *DataTrak* software allows the representation and the analysis of the profiles. By this means, all relevant data are examined and displayed for every point in time.
The PC programme enables the diver to keep a personal logbook. Apart from the 200 minutes of diving, 37 dives are registered in the form of the logbook function of Aladin® Sport. If the data of Aladin® Sport are transferred periodically, all dives are stored in the PC as profiles or in this short form. Time and date of the dives are automatically registered on the data transfer and the dives can be printed out on paper for the diver's logbook.

1 Trouble Shooting _____ 62

symptom	possible reason(s)	Procedure(s)
Altitude section does not correspond to the current altitude.	Atmospheric pressure is especially high or low.	Check meteorological information.
	Air pressure measured by the computer is wrong.	Send in dive computer for servicing (only if altitude section is wrong by more than one section, see chapter III 6).
Desaturation time and/or no fly time are very long.	Slow tissue and/or little workload at the surface.	Study chapter III 5 very carefully.
	Many repetitive dives, yoyo-diving or disregard of decompression stops have caused a large number of micro-bubbles, which have to decrease first.	Plan sufficiently long surface interval and dives at lower risk.
<Atn> appears in place of the diving depth on the display.	Many repetitive dives, too fast ascents, yoyo-diving or disregard of decompression stops have caused a large number of microbubbles, which have to decrease first.	Plan sufficiently long surface interval and dives at lower risk. Study chapters III 5 and IV very carefully.

symptom	possible reason(s)	Procedure(s)
An unexpected decompression stop appears in place of no-stop time or decompression stage is displayed.	Too rapid ascent or ignoring decompression stops have caused a large number of microbubbles, which leads to an attention message (warning of bubbles).	Plan sufficiently long surface interval and dives at lower risk. Study chapters III 5 and IV very carefully.



IX APPENDIX

1 Maintenance of Aladin® Sport Dive Computer ____ **66**

2 Technical Information ____ **68**

3 Warranty

3.1 Recognition of warranty ____ **69**

3.2 Scope of the warranty ____ **69**

3.3 Warranty period and claim ____ **70**

4 Important Remarks about Safety ____ **71**

1 Maintenance of Aladin® Sport Dive Computer

Aladin® Sport is almost maintenance free. Maintenance is restricted to changing batteries and rinsing with freshwater. In spite of that, some recommendations can contribute to the prevention of troubles and a higher life expectancy for the computer:

- Avoid sharp impacts and intense sunlight.
- Rinse your Aladin® Sport with freshwater after a dive in the sea.
- The Aladin® Sport should be stored dry in an aeriated receptacle. Storage in an air-tight receptacle has to be avoided.
- If there are Problems with the operation of the contacts, the surface of the housing can be treated with silicon spray or silicon grease. Clean the Aladin® Sport well with soap water beforehand and dry it thoroughly.
- Never pressure the Aladin® Sport out of water.

1 Maintenance of Aladin® Sport Dive Computer

– There are borings in two of the contacts for the reception of the PC-interface connections. Free these borings from dirt with a needle if necessary.

– Take the dive computer to an authorized retailer in order to change the batteries. The actual change of the batteries is made at the manufacturer's or the importer's. The computer is checked for its technical functioning at the same time.

If you follow these recommendations, you will enjoy a reliable Aladin® Sport for a long time.

Operating altitude: with decompression information: sea level up to approx. 4000 m
without decompression information: unlimited

Operating depth: no limitation for diving with compressed air

Clock: quartz timer, display up to 199 minutes

Operating temperature: -10 °C to +50 °C

Power supply: Special battery Uwatec LR07

Life of the battery: (standard values)
For an average diving time of 60 minutes and a decompression time of 20 hours after every dive:

Number of dives per year	Life (years)
50	10
100	8
150	6
300	4

3 Warranty

Please pay attention to the following remarks on warranty claims:

3.1 Recognition of warranty

The warranty only covers dive computers, which have been provably bought from an authorized retailer or from the manufacturer.

3.2 Scope of the warranty

The manufacturer undertakes to rectify all defects which are provably traceable
to defects of material or faults in production. The manufacturer decides about the qualification of a warranty claim and about the way of mending possible defects. This may be by repair of the computer free of charge, the replacement of faulty parts or replacement of the entire computer.

Excluded are faults or defects which go back to:

- Unqualified operation or strain
- Exterior influences, e.g. transport damages, damages due to bumping and hitting, meteorological influences or other natural phenomena.
- Servicing, repairs or the opening of the dive computer by anybody not authorized by the manufacturer. This especially concerns the change of batteries of the dive computer.
- Pressure tests which do not take place in water.
- Diving accidents.

3.3 Warranty period and claim

The warranty is given for a period of 12 months.

Repairs or replacements during the warranty period do not extend the original warranty period.

In order to put forward a warranty claim, send the dive computer together with a dated receipt of the purchase to your authorized retailer or an authorized servicing point.

The manufacturer does not have to accept extensions of the warranty granted by national importers.

4 Important Remarks about Safety

The Aladin® Sport offers a high measure of comfort and safety to the diver but the dive computer does *not* replace a profound dive training.
Pay strict attention to the optical alarm signals emitted by Aladin® Sport. Avoid risk situations, which are marked ⚠ or STOP in this manual.

Always observe the basic diving rules, which are also valid when diving with Aladin® Sport:

- Never dive alone - Aladin® Sport does not replace a diving partner!
- Always dive according to your level or training. Aladin® Sport does not increase your abilities as a diver!
- Due to the danger of nitrogen narcosis, do not dive lower than 40 metres. Aladin® Sport does not warn you in this respect.

The safety concept of Aladin® Sport includes this extensive operating manual. Confirm with your signature below that you have read this operating manual carefully and completely.

Place_____ Date _____ Signature _____